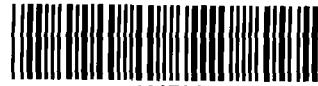




## Minnesota Pollution Control Agency

US EPA RECORDS CENTER REGION 5



466734

May 1, 1984

Mr. Donald J. Thimsen  
Manager, Environmental Engineering  
Engineering Policy  
General Mills, Incorporated  
P.O. Box 1113  
Minneapolis, Minnesota 55440

Dear Mr. Thimsen:

Enclosed for your review is the Minnesota Pollution Control Agency's (MPCA) proposed revisions to the General Mills Remedial Action Plan submitted to the MPCA on April 11, 1984. I anticipate that our meeting on May 7, 1984 will focus on General Mills' comments regarding MPCA's proposed Consent Order mailed to you on March 23, 1984 and on MPCA's proposed revisions to the General Mills Remedial Action Plan.

I am looking forward to a productive meeting on the 7th so that we can finalize these two documents. The meeting is currently scheduled for 9:00 a.m. in the MPCA's 3rd floor conference room on May 7, 1984. Please contact me regarding any changes to the meeting time or date. Thank you for your continued cooperation.

Sincerely,

Lisa Thorvig  
Regulatory Compliance Section  
Division of Solid and Hazardous Waste

LT:mec

cc: J. William Haun, General Mills, Inc.  
Kenneth D. Ohm, General Mills, Inc.  
Dennis J. Vaughn, Henkel Corporation  
Ms. Sharon Foote, U.S. Environmental Protection Agency  
Allan Gebhard, Barr Engineering Company  
Karen Theisen, U.S. Environmental Protection Agency, Region V  
Larry Kyte, U.S. Environmental Protection Agency, Region V

Phone: \_\_\_\_\_

1935 West County Road B2, Roseville, Minnesota 55113-2785

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EXHIBIT A  
REMEDIAL ACTION PLAN

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## PART I -- GROUND WATER REMEDIAL ACTION PROGRAM

### INTRODUCTION AND PURPOSE

The purpose of Part I of this Remedial Action Plan (hereinafter referred to as the "RAP") is to define and implement the procedures necessary for minimizing the further migration of volatile organic hydrocarbons and in particular Trichloroethylene (TCE) released from the General Mills site in the ground water in the glacial drift and the Platteville Formation, and to improve the quality of the ground water in the glacial drift and Platteville Formation in the area of the General Mills site. This RAP shall be implemented by General Mills, Inc. (hereinafter referred to as "General Mills") pursuant to Part F. of the Consent Order, to which this RAP is appended and made an integral and enforceable part thereof.

#### 1.0 GROUND WATER PUMP-OUT SYSTEMS

General Mills shall design, construct, and operate ground water pump-out systems in the glacial drift and the Carimona Member of the Platteville Formation (Carimona). General Mills shall, within 90 days of the effective date of the Consent Order, submit a proposed Ground Water Pump-Out System Plan (Plan) to U.S. EPA and the MPCA Director for modification and approval pursuant to Part G. of the Consent Order. Part G. of the Consent Order shall govern the review, modification, and approval of the Plan.

At a minimum, the proposed Plan shall contain the following Sections:

- 1.1 Glacial Drift Pump-Out System
- 1.2 Carimona Pump-Out System
- 1.3 Effluent Treatment Requirements

At a minimum, the proposed Plan shall specify and provide detailed discussions (and engineering plans and specifications where appropriate) as to the methods to be utilized by General Mills to ensure compliance with the

requirements specified in Sections 1.1 through 1.3 of Part I of this RAP. The proposed Plan shall also provide time schedules for implementation of each of the Sections 1.1 through 1.3 of Part I of this RAP.

### 1.1 Glacial Drift Pump-Out System

#### 1.1.1 Contaminant Capture Zone.

General Mills shall propose in the Plan the design, construction methods, and operational parameters of a glacial drift ground water pump-out system to remove and treat ground water in the glacial drift. At a minimum, the proposed capture zone for the glacial drift pump-out system shall be such that ground water in the area of the General Mills site having TCE concentrations of 270 ug/l or greater shall be captured by the pump-out system. The presently defined limit of the glacial drift ground water having TCE concentrations in excess of 270 ug/l is shown in Attachment A to this RAP.

#### 1.1.2 Pump-Out Well Locations.

The glacial drift pump-out wells shall be placed to capture all ground water contaminated with TCE in concentrations in the glacial drift that exceed 270 ug/l. At a minimum, the Plan shall propose one glacial drift pump-out well to be located in the southeastern corner of the General Mills site and \_\_\_\_\_ pump-out wells to be located downgradient of the General Mills site. One downgradient pump-out well shall be located on Como Avenue between 19th and 20th Avenues, one shall be located on \_\_\_\_\_.

The approximate location for each pump-out well is shown in

Attachment A to this RAP. The approximate limits of the capture zone for this \_\_\_\_\_ well pump-out system are also shown in Attachment A to this RAP. The glacial drift pump-out wells shall be a minimum of 4 inches in diameter and shall be screened through the entire saturated thickness of the alluvium in the glacial drift. The Plan shall propose the capture zone for the pump-out system and shall provide a discussion of the reasons for the proposed well locations and provide a detailed discussion of the further operation of the glacial drift ground water pump-out system. The system effectiveness monitoring described in Section 1.1.4 of Part I of this RAP shall be used to determine if operation of the glacial drift pump-out system requires revision in order to achieve compliance with Section 1.1.1 of Part I of this RAP.

1.1.3 Contaminant Capture Zone Modification.

General Mills shall notify U.S EPA and the MPCA Director at least thirty (30) days in advance of any proposed modification to the operation of the glacial drift ground water pump-out system. U.S. EPA and the MPCA Director shall review, modify, and approve the proposed modification pursuant to Part G. of the Consent Order.

If, after operation of the glacial drift pump-out system, the TCE concentration is reduced to below 90 ug/l in samples from any glacial drift monitoring or pump-out well, the operation of the pump-out system may be adjusted to exclude the area

monitored by that well. Samples shall be collected from the wells in any excluded area in conformance with Section 1.5 of Part II of this RAP, and the operation of the pump-out system shall be readjusted to capture ground water in the area monitored by any well where samples show a TCE concentration of 270 ug/l or greater.

1.1.4 System Effectiveness Monitoring.

General Mills shall propose in the Plan the details of a proposed program to monitor the effectiveness of the glacial drift ground water pump-out system. At a minimum, the effectiveness of the glacial drift ground water pump-out system shall be monitored by taking water level measurements from the network of wells specified in Section 1.3 of Part II of this RAP and collecting and analyzing ground water samples from a network of glacial drift monitoring wells as specified in Section 1.4.1 of Part II of this RAP.

1.2 Carimona Pump-Out System

1.2.1 Contaminant Capture Zone

General Mills shall propose in the Plan the design, construction methods and operational parameters of a Carimona ground water pump-out system to remove and treat ground water in the Carimona. At a minimum, the proposed capture zone for the Carimona pump-out system shall be such that ground water in the area of the General Mills site having a TCE concentration of 27 ug/l or greater shall be captured by the pump-out system. The presently defined limit of the Carimona

ground water showing TCE concentrations in excess of 27 ug/l is shown in Attachment B to this RAP.

1.2.2 Pump-Out Well Locations.

The Carimona pump-out well(s) shall be placed to capture all ground water contaminated with TCE in concentrations in the Carimona that exceed 27 ug/l. At a minimum, the Plan shall propose the Carimona pump-out system to include Well 108 located at the General Mills site being pumped at a rate of \_\_\_\_\_ gpm. The location of Well 108 is shown in Attachment B to this RAP. The predicted capture zone of this well is also shown in Attachment B to this RAP. The Plan shall propose the capture zone for the Carimona pump-out system and shall provide a discussion of the reasons for the proposed well location(s) and provide a detailed discussion of the further operation of the Carimona pump-out system. The system effectiveness monitoring described in Section 1.2.4 of Part I of this RAP shall be used to determine if an additional well or a revised pumping rate from Well 108 is needed to achieve compliance with Section 1.2.1 of Part I of this RAP.

1.2.4 System Effectiveness Monitoring.

General Mills shall propose in the Plan the details of a proposed program to monitor the effectiveness of the Carimona pump-out system. At a minimum, the effectiveness of the Carimona pump-out system shall be monitored using water level



measurements from the wells specified in Section 1.3 of Part II of this RAP and collecting and analyzing ground water samples from the network of Carimona monitoring wells specified in Section 1.4.2 of Part II of this RAP.

### 1.3 Effluent Discharge and Treatment Requirements

General Mills shall propose in the Plan the point of discharge for ground water pumped and treated from the glacial drift on Carimona pump-out systems. General Mills shall apply for and obtain an NPDES permit for the discharge of ground water from the glacial drift and Carimona pump-out systems. General Mills shall submit to the MPCA Director an application for an NPDES permit for the effluent from the glacial drift and Platteville ground water pump-out systems within 60 days of the effective date of the Consent Order.

Effluent limitations for the ground water pump-out system shall reflect a Best Available Technology Economically Achievable (BAT) level of treatment for volatile organic hydrocarbons and in particular TCE. In the NPDES permit application, General Mills shall make and detail a comparison of any proposed ground water pump-out treatment system with treatment employed by any of the primary industrial categories, as defined by the Clean Water Act, which may discharge volatile organic hydrocarbons and in particular TCE. General Mills shall use the following criteria as preliminary guidelines in making this determination:

- 1) Examine removal efficiencies for primary industries for the volatile organic hydrocarbons and in particular TCE;

- 2) Define the costs for treatment on some cost per unit basis that can be applied to the pump-out systems (i.e. cost per flow volume); and
- 3) Compare final discharge concentrations.

General Mills in pursuing this determination, shall examine and detail in the NPDES permit application the costs and treatment efficiency of combining contaminated wells starting with the most highly contaminated pump-out well and incorporating the next most contaminated well in sequence. General Mills shall also consider which effluent parameters would serve as the best indicator(s) of treatability (i.e. total volatile organic hydrocarbons or individual volatile organic hydrocarbons). The treatability and cost comparisons will determine effluent limitations and the number of pump-out wells to be treated. General Mills shall secure Metropolitan Waste Control Commission (MWCC) approval for discharge of contaminated ground water from all of the pump-out wells to the sanitary sewer so that the implementation dates specified in Section 2.0 of Part I of this RAP can be met regardless of the status of the NPDES permit application.

## 2.0 IMPLEMENTATION OF REMEDIAL ACTIONS

General Mills shall implement the Ground Water Pump-Out System Plan as modified or approved by U.S. EPA and the MPCA Director and in accordance with the requirements specified in this RAP.

General Mills shall complete new pump-out well installations required by the approved Plan and shall commence pumping of these wells within 90 days of notification of U.S. EPA and the MPCA Director's approval of

the Plan. Construction of an air-stripping facility and pretreatment of contaminated ground water may be delayed until issuance of an NPDES permit. General Mills shall dispose of contaminated ground water from the pump-out wells in the sanitary sewer as approved by MWC until issuance of an NPDES permit.

Termination of the ground water pump-out systems in the glacial drift and the Carimona Unit of the Platteville Formation shall be governed by Part BB. of the Consent Order.

### 3.0 MAGNOLIA REMEDIAL ACTIONS

On or before June 1, 1987 as part of the 1987 Annual Monitoring Report specified in Section 1.9.2 of Part II of this RAP, General Mills shall provide a summary of all the TCE data collected in the Magnolia Unit of the Platteville Formation (Magnolia) monitoring described in Section 1.6 of Part II of this RAP. If the TCE concentration in ground water drawn from any of the wells in the Magnolia have or continue to show TCE concentrations of 27 ug/l or greater, General Mills shall propose by June 1, 1987 remedial actions for the Magnolia for U.S. EPA and the MPCA Director modification and approval pursuant to Part G. of the Consent Order. Part G. of the Consent Order shall govern the review, modification, and approval of General Mills' proposed remedial actions for the Magnolia.

At a minimum, the remedial action proposal shall provide for a Magnolia ground water pump-out system comparable to the Carimona ground water pump-out system specified in Sections 1.2.1 through 1.2.4 of Part I of this RAP. General Mills shall propose a time schedule for implementation

of the Magnolia ground water pump-out system together with the design, construction, and operational information specified in Sections 1.2.1 through 1.2.4 of Part I of this RAP. General Mills shall secure any required MWCC approval, MPCA approval, or NPDES permit prior to discharge of ground water from a Magnolia pump-out system.

General Mills shall commence remedial actions required in the Magnolia within 90 days of U.S. EPA and the MPCA Director's notification of the modification or approval of the proposed remedial actions and in accordance with the requirements specified in this RAP.

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## PART II -- GROUND WATER MONITORING PROGRAM

### INTRODUCTION AND PURPOSE

The purpose of the ground water monitoring program is to: (1) monitor the effectiveness of the ground water pump-out systems; (2) define changes in the distribution of volatile organic hydrocarbon concentrations listed in Attachment C to this RAP after this RAP is implemented; and (3) determine when operation of the pump-out systems can be modified or terminated.

### 1.0 MONITORING PROGRAM

This section describes the monitoring well network, sampling frequency, and analytical parameters that shall be used in the ground water monitoring program.

#### 1.1 Analytical Parameter List

General Mills shall analyze samples collected as part of the ground water monitoring program for the volatile organic hydrocarbons listed in Attachment C to this RAP pursuant to the time schedules established in Sections 1.4 through 1.7 of Part II of this RAP.

#### 1.2 Quality Assurance/Quality Control Plan

General Mills shall submit a proposed Quality Assurance/Quality Control Plan (QA/QC Plan) to be utilized in implementing the monitoring program. The proposed QA/QC Plan shall be prepared so as to be consistent with the requirements of the U.S. EPA's Contract Laboratory Program. The proposed QA/QC Plan shall specify the procedures for:

- a. sample collection;
- b. chain-of-custody;

- c. calibration in terms of accuracy, precision, and references (the QA/QC Plan shall also specify the number of times and intervals at which analysis equipment will be calibrated);
- d. laboratory analytical methods, including methods for ensuring accurate measurements of data in terms of precision, accuracy, completeness, and comparability;
- e. reporting;
- f. internal quality control;
- g. audits;
- h. preventive maintenance;
- i. corrective action; and,
- j. routine assessment of data precision, representativeness, comparability, accuracy, and completeness of specific measurement parameters involved.

### 1.3 Water Level Monitoring

General Mills shall measure water levels to the nearest 0.01 of a foot prior to the collection of each ground water sample required in this RAP. Water levels shall be measured in all existing monitoring wells and in the pump-out wells every month during the first year of monitoring. The locations of the existing monitoring wells and proposed pump-out wells are shown in Attachment D to this RAP.

### 1.4 Operational Monitoring

The monitoring program described in this section shall be used by General Mills during the time the glacial drift or Carimona pump-out systems are operational.

#### 1.4.1 Glacial Drift Monitoring

##### 1.4.1.1 Monitoring Well Network.

The glacial drift monitoring well network shall include those wells numbered 1, 3, 4, and 107, and those wells lettered B, H, J, Q, R, S, T, U, V, W, X, Y, and Z. The locations of these wells are shown in Attachment E to this RAP.

##### 1.4.1.2 Sampling Frequency.

General Mills shall collect samples from the glacial drift monitoring well network specified in Section 1.4.1.1 of Part II of this RAP and each glacial drift pump-out well once every two (2) months for the first year of monitoring commencing in accordance with the implementation schedule specified in Section 2.0 of Part II of this RAP.

##### 1.4.1.3 Monitoring Parameters.

General Mills shall analyze all glacial drift ground water samples collected pursuant to Section 1.4.1.2 above for the compounds listed in Attachment C to this RAP on the 2nd, 6th, and 10th months and only TCE on the 4th, 8th and 12th months for the first year of monitoring.

## 1.4.2 Carimona Monitoring

### 1.4.2.1 Monitoring Well Network.

The monitoring well network for the Carimona shall be Wells BB, II, LL, RR, SS, UU, WW, 8, 9, 10, 11, 12, and 13 located as shown in Attachment E to this RAP.

### 1.4.2.2 Sampling Frequency.

General Mills shall collect samples from the Carimona monitoring well network specified in Section 1.4.2.1 of Part II of this RAP and the Carimona pump-out well(s) once every two (2) months during the first year of monitoring commencing in accordance with the implementation schedule specified in Section 2.0 of Part II of this RAP.

### 1.4.2.3 Monitoring Parameters.

General Mills shall analyze all Carimona ground water samples collected pursuant to Section 1.4.2.2 above for the compounds listed in Attachment C to this RAP on the 2nd, 6th, and 10th months and only TCE on the 4th, 8th and 12th months for the first year of monitoring.



### 1.5 Post-Operational Monitoring

As described in Sections 1.1.1 and 1.2.1 of Part I of this RAP, operation of the glacial drift and/or Carimona pump-out system may be adjusted to terminate operation of pump-out wells where the ground water monitoring data show that the concentration of TCE in the ground water has achieved the levels specified in Section 1.1.3 and/or 1.2.3 of Part I of this RAP. The frequency of sampling shall remain as set forth in Section 1.4 of Part II of this RAP for the remainder of that monitoring year. Any changes in the glacial drift and/or Carimona ground water monitoring program shall be proposed by General Mills in the annual monitoring report as specified in Section 1.9.2 of Part II of this RAP.

### 1.6 Magnolia Monitoring

#### 1.6.1 Monitoring Well Network.

The monitoring well network for the Magnolia shall be Wells GG, QQ, OO, TT, VV, and ZZ, located as shown in Attachment E to this RAP.

#### 1.6.2 Sampling Frequency.

General Mills shall collect samples from the Magnolia monitoring well network specified in Section 1.6.1 of Part II of this RAP once every two (2) months during the first year of monitoring commencing in accordance with the implementation schedule in Part 2.0 of Part II of this RAP.

### 1.6.3 Monitoring Parameters.

General Mills shall analyze all ground water samples collected pursuant to Section 1.6.2 above for the compounds listed in Attachment C to this RAP on the 2nd, 6th, and 10th months and only TCE on the 4th, 8th and 12th months for the first year of monitoring.

### 1.7 St. Peter Monitoring

General Mills shall, within 60 days of the effective date of the Consent Order, submit a proposed St. Peter Monitoring Plan to U.S. EPA and the MPCA Director for modification and approval pursuant to Part G. of the Consent Order. Part G. of the Consent Order shall govern the review, modification, and approval of the St. Peter Monitoring Plan.

At a minimum, the proposed St. Peter Monitoring Plan shall contain the following Sections:

- 1.7.1 Monitoring Well Network;
- 1.7.2 Monitoring Well Design;
- 1.7.3 Sampling Frequency;
- 1.7.4 Monitoring Parameters; and
- 1.7.5 Monitoring Well Installation.

#### 1.7.1 Monitoring Well Network.

General Mills shall install three monitoring wells in the St. Peter Formation to define the ground water flow direction and through collection and analysis of ground water samples

determine the water quality in the St. Peter Formation.  
General Mills shall propose in the St. Peter Monitoring Plan the location of the three St. Peter monitoring wells.

1.7.2 Monitoring Well Design.

General Mills shall propose in the St. Peter Monitoring Plan the design for construction of the St. Peter monitoring wells in accordance with the Minnesota Department of Health well code.

1.7.3 Sampling Frequency.

General Mills shall propose in the St. Peter Monitoring Plan the frequency for collecting ground water samples from the St. Peter monitoring wells. At a minimum, the St. Peter monitoring wells shall be sampled once every two (2) months during the first year of monitoring commencing in accordance with the implementation schedule specified in Section 2.0 of Part II of this RAP.

1.7.4 Monitoring Parameters.

General Mills shall analyze all St. Peter Formation ground water samples for the compounds listed in Attachment C to this RAP on the 2nd, 6th, and 10th months and only TCE on the 4th, 8th, and 12th months for the first year of monitoring.

1.7.5 Monitoring Well Installation.

General Mills shall complete installation of the St. Peter monitoring wells within 30 days of U.S. EPA and the MPCA Director's notification of approval of the St. Peter Monitoring Plan.

1.8 Bedrock Well Monitoring

The Prairie du Chien-Jordan well on the Henkel property shall be sampled by General Mills once each year. Samples shall be analyzed for the compounds listed in Attachment C to this RAP. Monitoring of the ground water in the Prairie du Chien-Jordan well on the Henkel property shall continue for as long as the Carimona and/or Magnolia pump-out systems are operated.

1.9 Reporting

1.9.1 Monthly Monitoring Reports.

General Mills shall submit the analytical results to the MPCA Project Leader by the tenth of each month for all analyses completed during the previous month.

1.9.2 Annual Monitoring Report.

General Mills shall submit an annual monitoring report to the MPCA Project Leader on or before June 1, 1985 and each June 1 thereafter for a period of 30 years from the effective date of the Consent Order. Each annual report shall contain the following information:

- a. results of all water level measurements and chemical analyses for the previous year;
- b. water level contour maps for each formation showing high and low ground water levels;
- c. maps showing the sum of the compounds listed in Attachment C to this RAP analyzed for at each well location for each sampling event and maps showing the TCE concentrations analyzed for at each well location for each sampling event;
- d. a proposed sampling plan for the next monitoring year with an assessment of the monitoring parameters and frequencies and the need for the addition or deletion of monitoring wells or parameters or a change in sampling frequency; and
- e. a discussion and summary of the reporting year's data in comparison to previously available data.

## 2.0 IMPLEMENTATION OF MONITORING PROGRAM

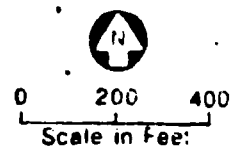
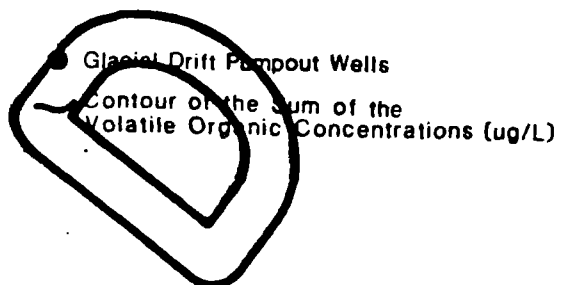
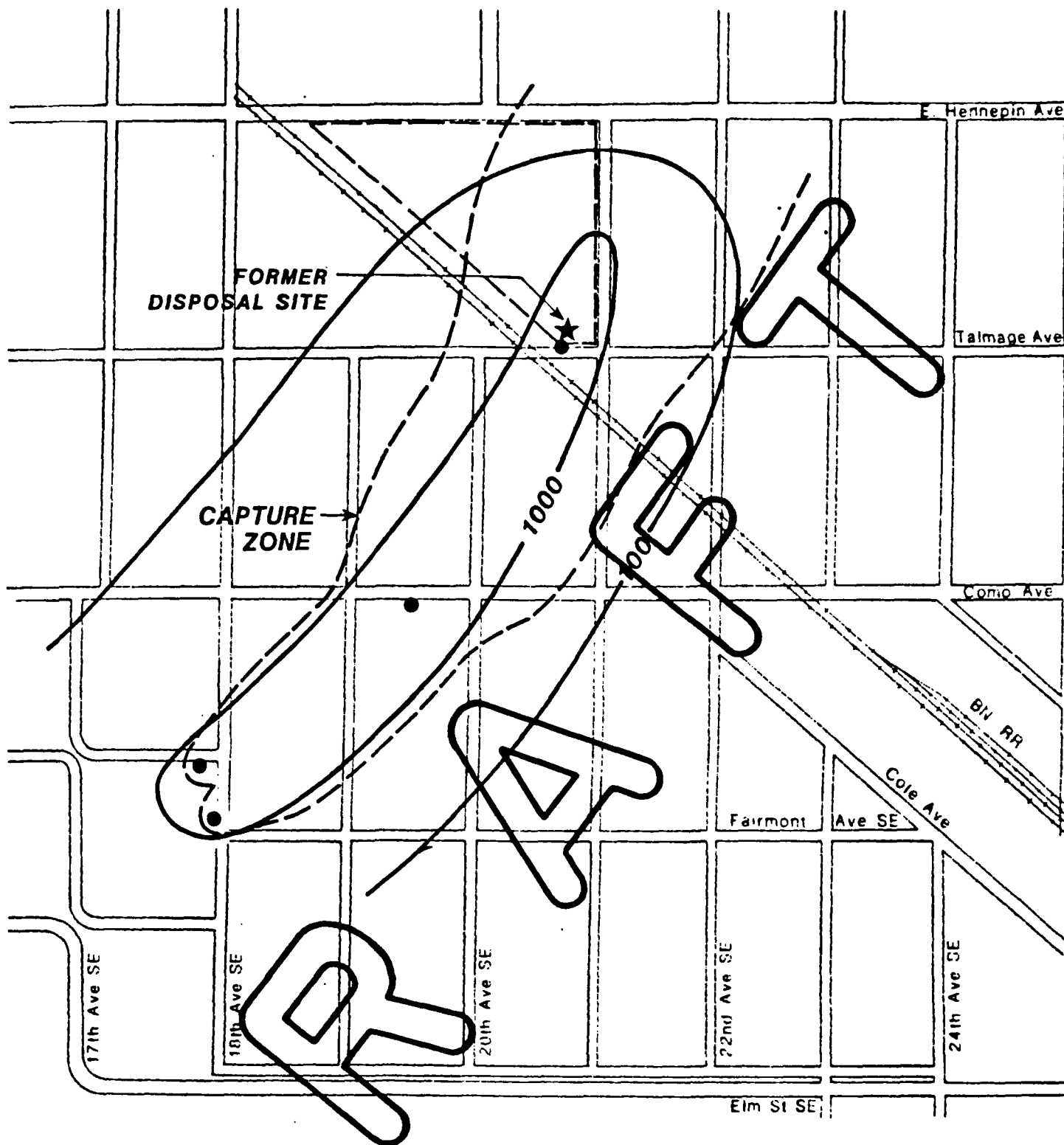
General Mills shall implement the ground water monitoring program described in Section 1.0 of Part II of this RAP, in accordance with the requirements specified in this RAP.

On or before March 1, 1985, General Mills shall commence the first year's monitoring of the ground water as specified in Sections 1.4 through 1.8 of Part II of this RAP.

On or before March 1, 1986, General Mills shall complete the first year of the ground water monitoring program.

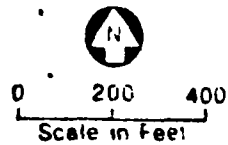
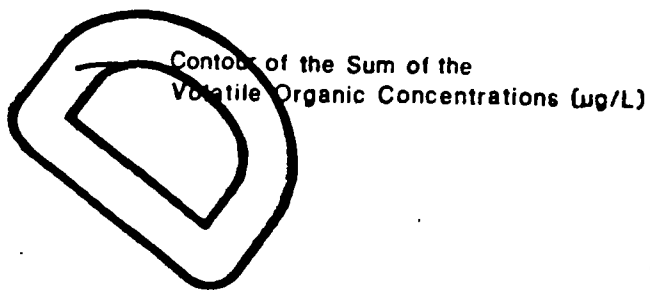
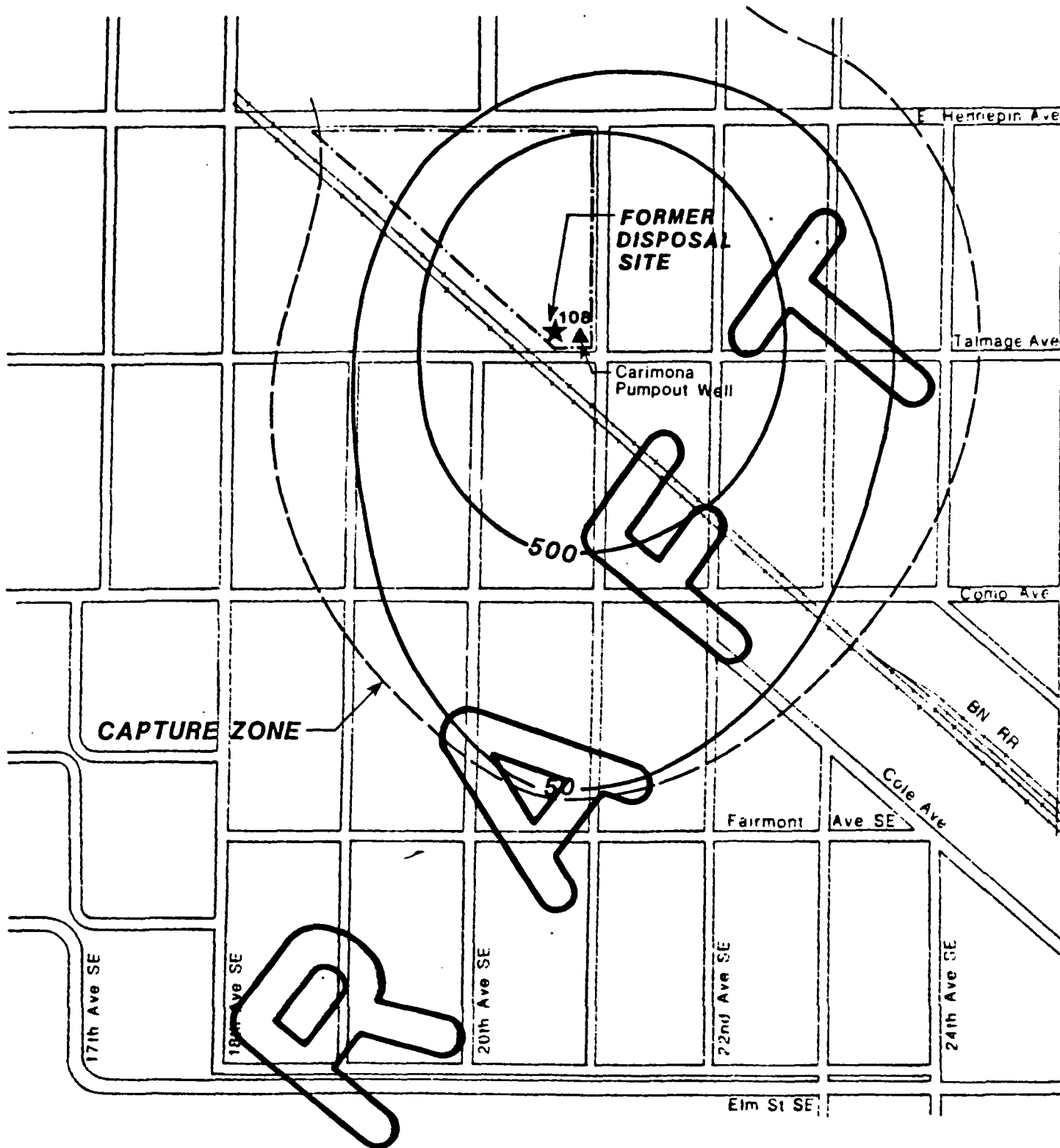
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\* Need to modify to show TCE contours and new estimated capture zone



ATTACHMENT <sup>A</sup><sub>B</sub>  
GLACIAL DRIFT  
PUMPOUT SYSTEM

\* Need to modify to show TCE contours and estimated capture zone



ATTACHMENT **B** X  
CARIMONA  
PUMPOUT SYSTEM



ATTACHMENT C  
ANALYTICAL PROGRAM PARAMETERS

Chlorinated Volatile Hydrocarbons

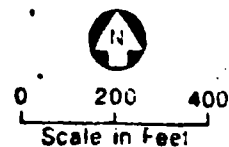
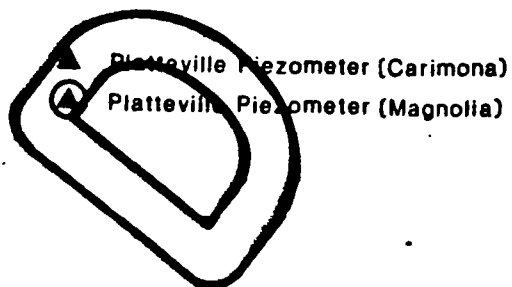
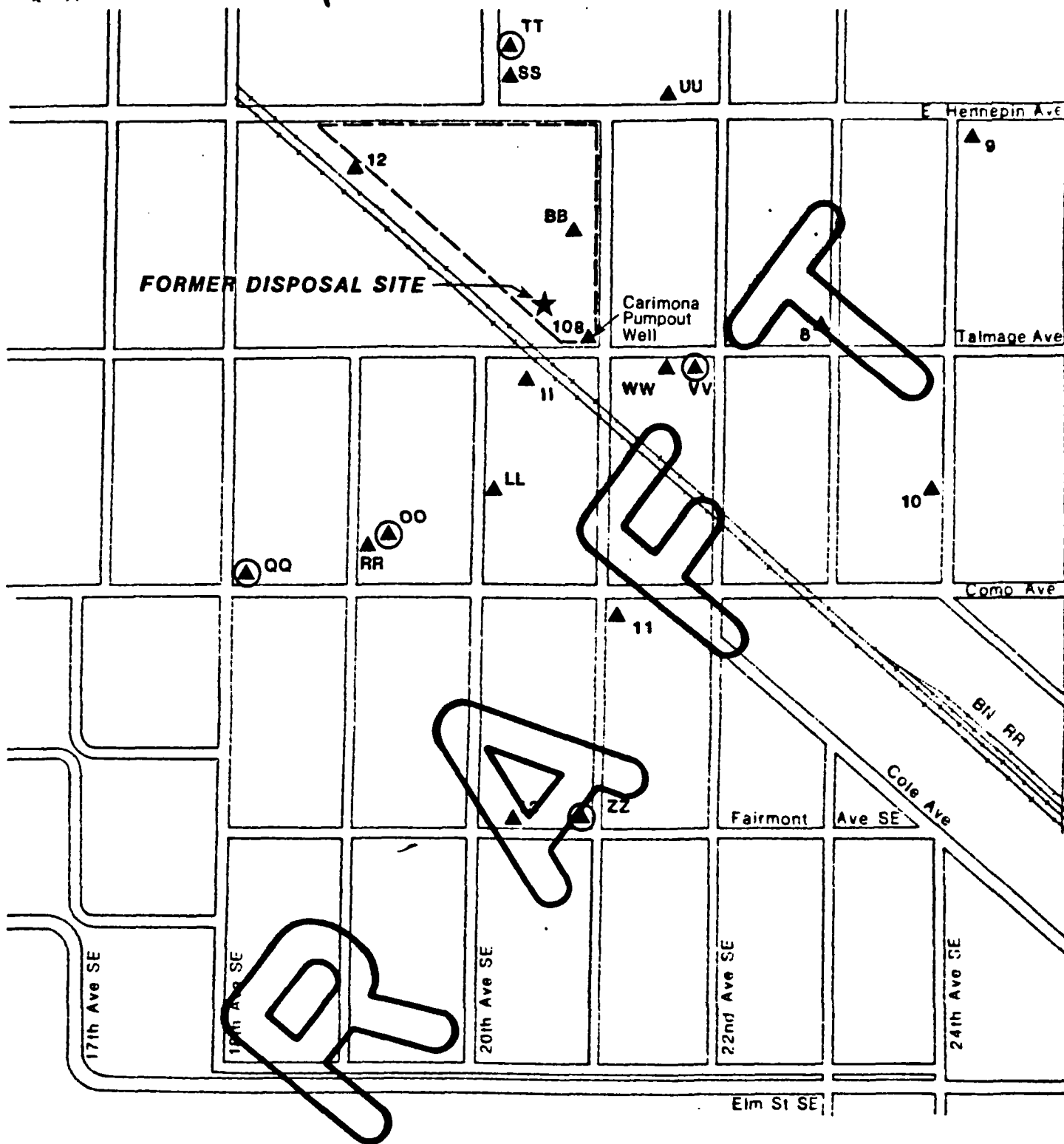
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Chloroform  
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1,2-Dichloroethane  
1,1-Dichloroethylene  
1,2-Dichloroethylene, cis  
1,2-Dichloroethylene, trans  
1,2-Dichloropropane  
Methylene Chloride  
Methyl Isobutyl Ketone  
1,1,2,2-Tetrachloroethane  
Tetrachloroethylene  
1,1,1-Trichloroethane  
1,1,2-Trichloroethane  
Trichloroethylene

Non-Chlorinated Volatile Hydrocarbons

Benzene  
Ethylbenzene  
Toluene  
Xylenes

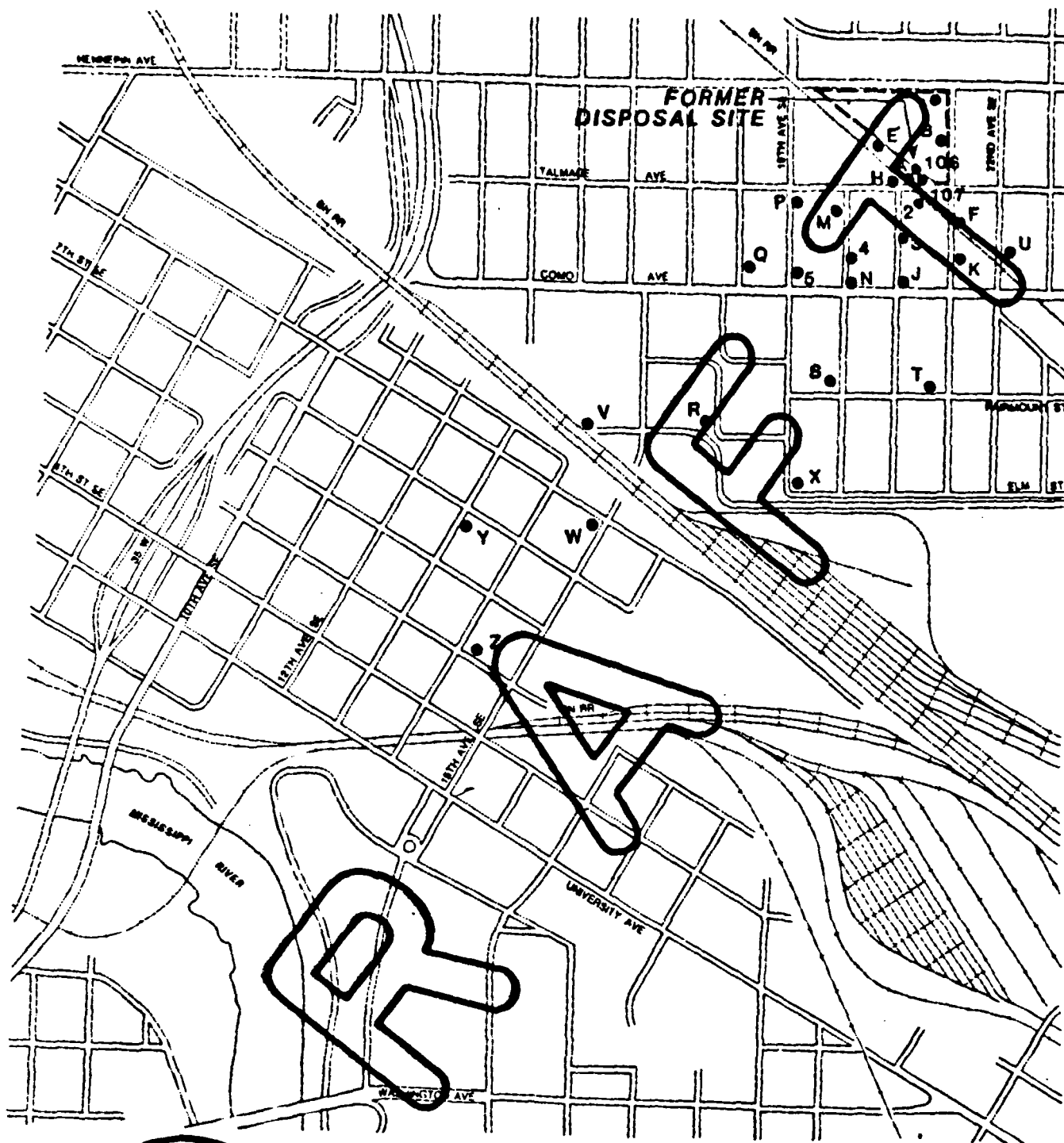
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\* Add G6 to the map



# ATTACHMENT <sup>P</sup><sub>F</sub> CARIMONA & MAGNOLIA WATER LEVEL MONITORING WELLS

\* include the glacial drift pump-out wells to the map.



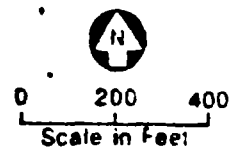
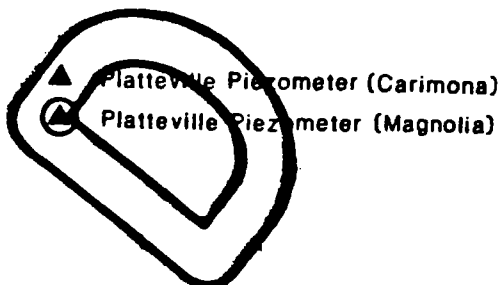
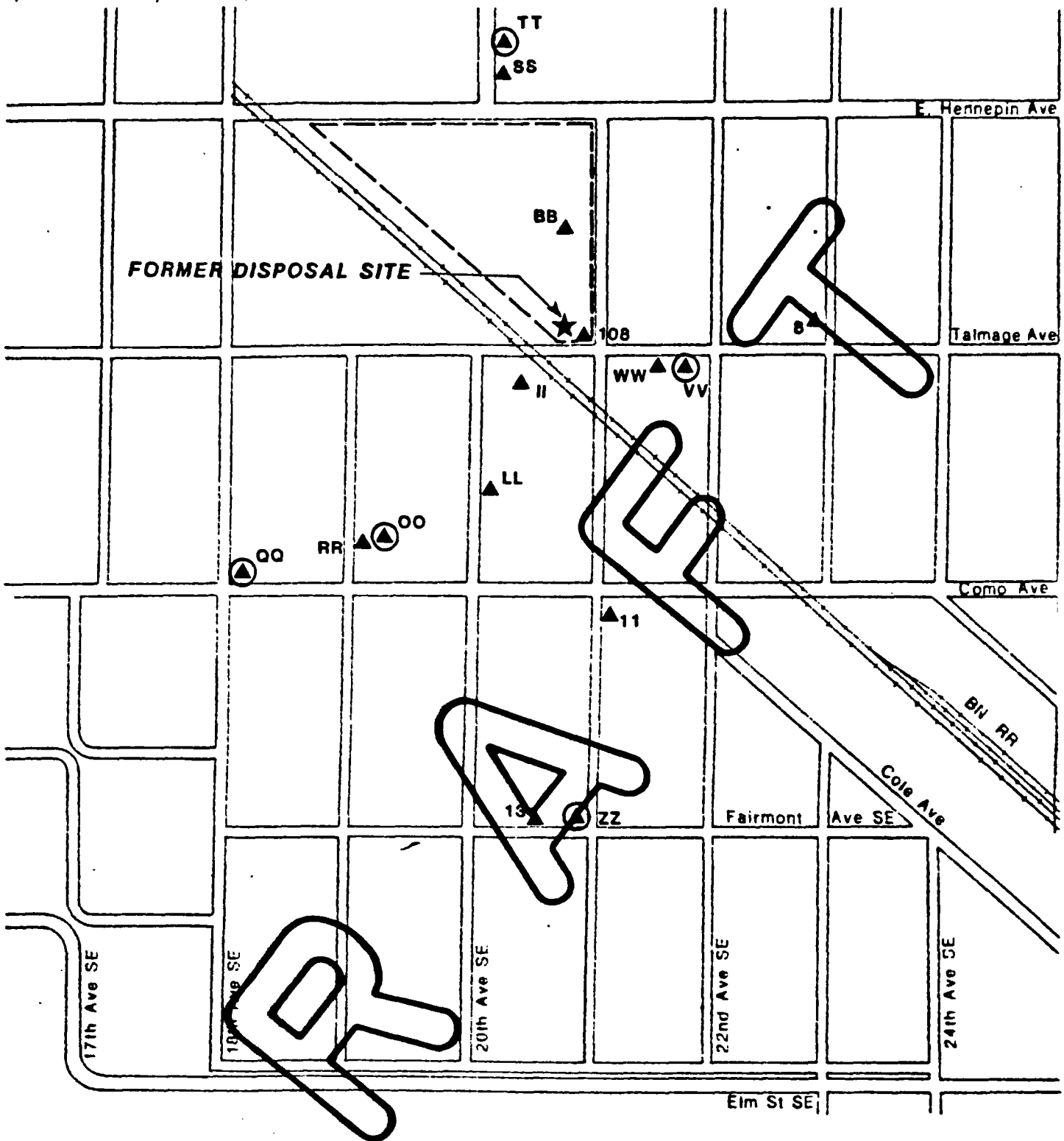
● Glacial Drift Wells



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Scale in feet

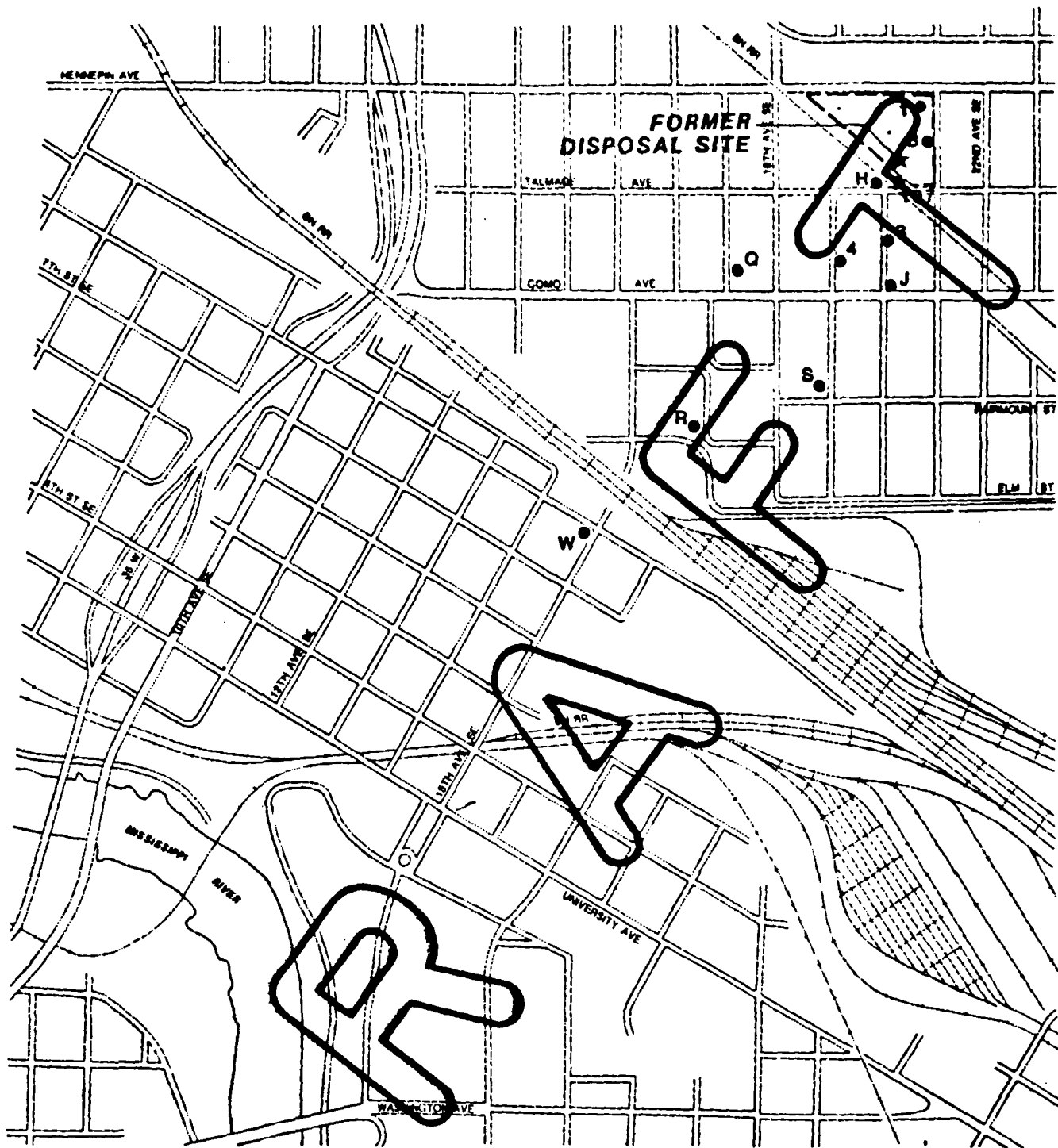
D  
ATTACHMENT F (Cont.)  
GLACIAL DRIFT WATER  
LEVEL MONITORING WELLS

\* Add GG, UU, 9, 10 and 12 to the map



ATTACHMENT <sup>E</sup>  
 CARIMONA & MAGNOLIA  
 SAMPLING WELLS

\* Add glacial drift pump out wells, T, U, V, X, Y, and Z to the map.



● Glacial Drift Well



0 1000  
Scale in feet

ATTACHMENT E (Cont.)

GLACIAL DRIFT SAMPLING WELLS